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10/585,707	07/10/2006	Minoru Umemoto	KANEKO.014AUS	4346

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EXAMINER	
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ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/585,707	UMEMOTO ET AL.	
	Examiner	Art Unit	
	CHRISTOPHER KESSLER	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 April 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16,21-23 and 40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16,21-23 and 40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/12/10*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Responsive to the amendment filed 12 April 2010, claims 16, 21, 22 and 23 are amended and claim 40 is added. Claims 16, 21-23 and 40 are currently under examination.

Status of Previous Rejections

2. Responsive to the amendment filed 12 April 2010, new grounds of rejection are presented.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 16, 21-23 and 40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 16 requires the limitation "Wherein, in the drilling operation, when hardness H of the workpiece W is lower than 500 [Hv], a peripheral velocity V of the drill

D is higher than (175 - H / 4) [m/min] and a feed amount of the drill per one revolution is smaller than 0.03 mm." This feature is not described by the instant specification.

Claim 16 requires the limitation "when the hardness H of the workpiece W is higher than 500 [Hv], the peripheral velocity V of the drill D is higher than 50 [m/min] and the feed amount of the drill D per one revolution is smaller than 0.03 mm." This feature is not described by the instant specification.

Each of claims 21-22 is dependent on claim 16, and is therefore also not described.

5. Claim 40 requires the limitation "Wherein, in the drilling operation, when hardness H of the workpiece W is lower than 500 [Hv], a peripheral velocity V of the drill D is higher than (175 - H / 4) [m/min] and a feed amount of the drill per one revolution is smaller than 0.03 mm." This feature is not described by the instant specification.

Claim 40 requires the limitation "when the hardness H of the workpiece W is higher than 500 [Hv], the peripheral velocity V of the drill D is higher than 50 [m/min] and the feed amount of the drill D per one revolution is smaller than 0.03 mm." This feature is not described by the instant specification.

Claim 23 is dependent on claim 40, and is therefore also not described.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 16, 21-23 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 3,117,042 issued to Blechner (hereinafter "Blechner").

Regarding claim 16, Blechner teaches the invention substantially as claimed. Blechner teaches a method of heat treating metals (see col. 1). Blechner teaches performing a machining operation on the surface of the workpiece using a machining tool (see cols. 3-4). Blechner teaches that the method can be used in order to generate a plastic deformation in the workpiece (see col. 4). Blechner teaches that the method forms a crystal layer on the workpiece (see col. 4). Blechner teaches that the steel is heated to above Ac1 (see cols. 2-3, col. 4, Examples).

Blechner does not teach a method of drilling. Blechner teaches machining in general, and that the method is applicable to processes similar to milling or reaming (see col. 3). Reaming would be similar enough to drilling that one of ordinary skill in the art would have expected the same effects to be present in the method, and thus drilling would have been obvious to one of ordinary skill in the art.

Blechner does not teach wherein the crystal layer is an ultrafine crystal layer. Blechner does not teach that a large local strain in the part induced by the process is equal to 1 true engineering strain. Blechner does not teach the machining parameters (tool velocity, feed rate) as claimed.

Blechner teaches that the layer is variable in its thickness by varying the machining parameters (see cols. 2-3 and col. 4). Blechner teaches that the thickness of the crystal layer may be 0.001 mm or less (see col. 4). Thus, the range of possible size

of the crystals in the layer would have fallen within the range as claimed (Ultrafine), establishing a prima facie case of obviousness. It would have been obvious to one of ordinary skill in the art at time of invention to have created ultrafine crystals in the layer of Blechner because Blechner teaches that the total thickness of the layer is 0.001 mm or less (see col. 4). It would have been obvious to one of ordinary skill in the art at time of invention to have optimized the machining parameters, because Blechner teaches that adjusting these parameters affects the thickness of the layer (see cols. 2-3 and col. 4). Applicant is further directed to MPEP 2144.05.

Blechner does not describe the measure of plastic deformation present in the workpiece. Blechner only describes that if the parameters are increased (such as pressure), plastic deformation will result (see col. 6). The amount of pressure to be used, and thus the resulting strain (plastic deformation amount) are not taught. However, the similar process would have resulted in the similar results as claimed. Applicant is further directed to MPEP 2112.01. In the alternative, it would have been obvious to one of ordinary skill in the art at time of invention to have optimized the deformation of the workpiece because Blechner teaches that the working parameters (such as pressure) are easily adjusted by one of ordinary skill in the art in order to achieve the desired parameters of thickness depth, hardness, shape, etc. in the work (see cols. 2-3 and col. 4).

Regarding claim 40, Blechner teaches that the material may be a nonsteel material which is heated to the melting point (see claim). A prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but

are close enough that one skilled in the art would have expected them to have the same properties. Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). In the instant case, the condition of heating to the melting point is close enough to the claimed range of lower than the melting point that one of ordinary skill in the art would have expected to processes to have the same properties. Applicant is further directed to MPEP 2144.05.

In the alternative, Blechner teaches that the method applies to materials which are not steel, but to which apply the common principles of heat treating steel (see col. 2). Thus, it would have been obvious to one of ordinary skill in the art at time of invention to have substituted a non-steel nickel or cobalt material for the steel.

Regarding claim 21, Blechner teaches that the machined surface us cooled after the machining has been performed (see col. 1). Blechner teaches that the cooling rate is high enough to retain an austenitic structure (see col. 1), thus meeting the limitation of higher than a cooling rate that is required for hardening.

Regarding claim 22, Blechner does not teach that a non-ultrafine layer is created by holding the material at 500˚ C for a time not larger than one second, or wherein the hardness of that layer is 80% as high as the substrate, or wherein that layer is beneath the ultrafine layer.

Blechner teaches that the heat treating temperature is above Ac1 (see col. 1). Thus, the surface layer of Blechner is inherently heated to well above 500˚ C in the process. The heating of the layer below the surface would have been inherent in the process, due to the conduction of heat into the bulk of the material. For example,

Blechner teaches that the heat is dissipated throughout the workpiece (see col. 2). Thus, a layer of material below the surface would have been heated to a temperature as claimed.

Blechner teaches that the treatment time is a results-effective variable (see col. 2). Thus the optimization of the heating time would have been obvious to one of ordinary skill in the art through routine investigation. Applicant is further directed to MPEP 2144.05.

Regarding the limitation wherein the hardness of that layer is 80% as high as the substrate, or wherein that layer is beneath the ultrafine layer, this feature would have been inherent in the method of Blechner, because the similar material, processed similarly, must inherently have the same properties as claimed. Applicant is further directed to MPEP 2112.01.

Response to Arguments

8. Applicant's arguments filed 12 April 2010 have been fully considered but they are not persuasive.

Applicant argues that feature 3 added to the claims is supported by the specification. However, this feature is not supported by the instant specification at paragraphs 70-71 or elsewhere.

Applicant argues that Blechner merely teaches hardening. However, Blechner teaches a method of forming a crystallized layer by machining operations (see cols. 3-

4), and the claimed process would have been obvious to one of ordinary skill in the art for the reasons stated above.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER KESSLER whose telephone number is (571)272-6510. The examiner can normally be reached on Mon-Fri, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Roy King/
Supervisory Patent Examiner, Art Unit 1793

csk